

Department of Computer Science & Applications  
 Chaudhary Devi Lal University, Sirsa (Haryana)  
 Scheme & Syllabi of Examination for  
 Master of Technology in Computer Science & Engineering  
 (M. Tech. CSE Week End)  
 under Choice Based Credit System

SEMESTER-I	L/T	P	Credit	Int	Ext	Total
MT-PT-11 Advanced Computer Architecture	4	-	4	30	70	100
MT-PT-12 Advanced Database Systems	4	-	4	30	70	100
MT-PT-13 Lab-I (Based on MT-PT-12)	-	4	2	20	30	50
MT-PT-14 Seminar	2	-	2	50	-	50
<b>Total</b>			<b>12</b>	<b>130</b>	<b>170</b>	<b>300</b>

SEMESTER-II	L/T	P	Credit	Int	Ext	Total
MT-PT-21 Big Data Analytics	4	-	4	30	70	100
MT-PT-22 Advanced Operating Systems	4	-	4	30	70	100
MT-PT-23 Lab-II (Based on MT-PT-22)	-	4	2	20	30	50
MT-PT-24 Seminar	2	-	2	50	-	50
<b>Total</b>			<b>12</b>	<b>130</b>	<b>170</b>	<b>300</b>

SEMESTER-III	L/T	P	Credit	Int	Ext	Total
MT-PT-31 Advanced Software Engineering	4	-	4	30	70	100
MT-PT-32 Advanced Data Structures	4	-	4	30	70	100
MT-PT-33 Lab-III (Based on MT-PT-32)	-	4	2	20	30	50
MT-PT-34 Seminar	2	-	2	50	-	50
<b>Total</b>			<b>12</b>	<b>130</b>	<b>170</b>	<b>300</b>

SEMESTER-IV	L/T	P	Credit	Int	Ext	Total
MT-PT-41 Simulation and Modeling	4	-	4	30	70	100
MT-PT-42 Elective	4	-	4	30	70	100
MT-PT-43 Lab-IV (Based on MT-PT-41)	-	4	2	20	30	50
MT-PT-44 Seminar	2	-	2	50	-	50
<b>Total</b>			<b>12</b>	<b>130</b>	<b>170</b>	<b>300</b>

List of elective subjects for MT-PT-42

- (i) Advanced Computer Networks
- (ii) Advanced Microprocessors
- (iii) Soft computing

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SEMESTER-V

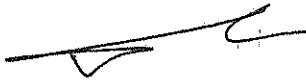
	L/T	P	Credit	Int	Ext	Total
MT-PT-51 Research Methodology	4	-	4	30	70	100
MT-PT-52 Elective	4	-	4	30	70	100
MT-PT-53 Lab-V (Based on MT-PT-51)	-	4	2	20	30	50
MT-PT-54 Seminar	2	-	2	50	-	50
<b>Total</b>			<b>12</b>	<b>130</b>	<b>170</b>	<b>300</b>

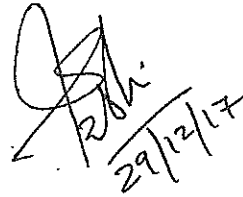
List of elective subjects for MT-PT-52

- (i) Advanced Artificial Intelligence
- (ii) Advanced Digital Image Processing
- (iii) Advanced Compiler Design

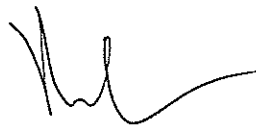
SEMESTER-VI

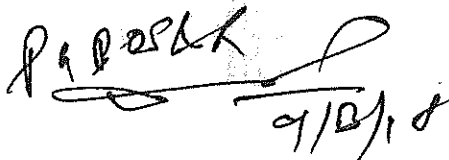
	L/T	P	Credit	Int	Ext	Total
MT-PT-61 Dissertation	2	-	12	75	225	300



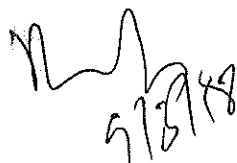
  
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## MT-PT-51 Research Methodology

L/T	P	Credit	Int	Ext
4	-	4	30	70

Note:-Total 09 Questions are to be set by the examiner. First question will be compulsory consisting of 5 short (each 2 marks) questions covering entire syllabus uniformly. In addition 8 more questions will be set unit wise comprising 2 questions from each unit of the given syllabus. A candidate is required to attempt five questions in all selecting one question from each unit including the compulsory question.

### Unit-I

**Research an Introduction:** Meaning, Characteristics, Classification, Importance.  
**Research Methods and Techniques:** Classification of Research Methods, Advantages and Limitations, Steps Involved.

**Review of Literature:** Meaning, Importance.

**Formulation of Research Problem:** Formulation of Research Problem, Sources of Research Problem, Criteria of a good Research Problem, Formulation and Stating the Problem, Common Errors.

### Unit-II

**Hypothesis:** Meaning, Importance, Types, Sources, Characteristics, Testing.

**Research Design:** Meaning, Characteristics of a Good Research Design, Components of a Research Design, Types of Research Design.

**Census and Sample Investigation:** Meaning of Census and Sampling Investigation, Objective of Sampling, Advantages of Sampling and Census Method, Types of Sampling Techniques, Sampling Errors.

### UNIT-III

**Data Collection:** Primary and Secondary Data, Methods of Primary Data Collection, Sources of Secondary Data, Precautions in the use of Secondary Data, Data Reduction.

**Processing of Data:** Editing, Coding, Classification.

**Analysis and Statistical Techniques:** Meaning of Analysis, Primary Data Analysis, Secondary Data Analysis, Characteristics of Data Analysis, Statistical Methods in Analysis.

### UNIT-IV

**Interpretation of Data:** Meaning and Need, Pre-requisites of Interpretation, Sources of Errors, Conclusion and Generalization.

**Simulation:** introduction, Advantages and Disadvantages of Simulation, Steps in Simulation, Modeling, Modeling Principals, Types of Model.

**Report Writing:** Research Report, Types of Reports, Steps in Report Writing, Format of Research Report, Style and Typing of Research Report, Problems in Preparing Research Report.

#### References:

1. Research Methods by Santosh Gupta
2. Research Methods by Lokesh Koul
3. Research Methods by C R Kothari
4. Research Methods by Ranjit Kumar



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## MT-PT-32-- ADVANCED DATA STRUCTURES

L/T	P	Credit	Int	Ext
4	-	4	30	70

Note:-Total 09 Questions are to be set by the examiner. First question will be compulsory consisting of 5 short (each 2 marks) questions covering entire syllabus uniformly. In addition 8 more questions will be set unit wise comprising 2 questions from each unit of the given syllabus. A candidate is required to attempt five questions in all selecting one question from each unit including the compulsory question.

### UNIT I

Iterative Algorithms; Measures of Progress and Loop Invariants; Paradigm Shift: Sequence of Actions versus Sequence of Assertions; Steps to Develop an Iterative Algorithm; Different Types of Iterative Algorithms; Recursion-Forward versus Backward; Proving Correctness with Strong Induction; Examples of Recursive Algorithms. Ackermann's Function; Recursion on Trees-Tree Traversals; Heap Sort and Priority Queues; Representing Expressions.

### UNIT II

Optimization Problems; Graph Search Algorithms; Generic Search; Breadth-First Search; Dijkstra's Shortest-Weighted-Path ;Depth-First Search; Recursive Depth-First Search; Hill Climbing; Primal Dual Hill Climbing Steepest Ascent Hill Climbing; Recursive Backtracking; Developing Recursive Backtracking Algorithm

### UNIT III

Developing a Dynamic Programming Algorithm; Question for the Little Bird Sub-instances and Sub-solutions; Set of Substances; Decreasing Time and Space; Number of Solutions; Bipartite Matching. Randomized Algorithms; Branch-and-Bound: Method, 0/1 knapsack and traveling salesperson problem, efficiency considerations.

### UNIT IV

Practice-Linked Lists; The Role of Locking; List-Based Sets; Concurrent Reasoning; Coarse Grained Synchronization; Fine-Grained Synchronization; Optimistic Synchronization; Lazy Synchronization; Non-Blocking Synchronization; Concurrent Queues and the ABA Problem Queues; A Bounded Partial Queue; An Unbounded Total Queue; An Unbounded Lock-Free Queue

### REFERENCES:

1. Jeff Edmonds, "How to Think about Algorithms", Cambridge University Press. 2008.
2. Maurice Herlihy, NirShavit, "The Art of Multiprocessor Programming" Elsevier 2008
3. Steven S. Skiena, "The Algorithm Design Manual", Springer, 2008.
4. Peter Brass, "Advanced Data Structures", Cambridge University Press, 2008.
5. S. Dasgupta, C. H. Papadimitriou, and U. V. Vazirani, "Algorithms", McGrawHill, 2008.
6. V. Aho, J. E. Hopcroft, and J. D. Ullman, "The Design and Analysis of Computer Algorithms", Addison-Wesley.

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